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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/687,715	10/17/2003	Mei Chen	100205025-1	4628

22879 7590 01/23/2008

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FORT COLLINS, CO 80527-2400

EXAMINER
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DALEY, CLIFTON G

ART UNIT	PAPER NUMBER
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2624

NOTIFICATION DATE	DELIVERY MODE
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01/23/2008

ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	10/687,715	CHEN, MEI	
	<b>Examiner</b>	<b>Art Unit</b>	
	Clifton G. Daley	2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 09 October 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-7 and 9-20 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 9-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 09 October 2007 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>10/9/2007</u> .   | 6) <input type="checkbox"/> Other: _____                          |

## DETAILED ACTION

### *Response to Amendment*

This action is Final. Claims 1-7 and 9-20 are currently pending. Applicant's response received on 10/9/2007 is fully considered herein and is not persuasive.

### *Claim Rejections - 35 USC § 103*

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. **(New grounds)** Claims 1-3, 5-6, 9, 13, 14 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minami et al. (Hereinafter "Minami"; US 6380986) in view of Toklu et al. (Hereinafter "Toklu" (US 6724915).

**(New 103(a) rejection)** Regarding **amended Claim 1**, Minami discloses a method for estimating a displacement of an object appearing in a first image and a second image, comprising:

ascertaining a respective candidate location of the object in each of a plurality of search regions in the second image (**column 3, lines 17-44**); and

for each of the search regions, determining a respective candidate displacement vector relating the respective candidate location of the object and a location of the object in the first image (**column 12, lines 25-41, i.e. motion vector (candidate displacement vector) is determined using minimum computed value of the sum of the absolute values of differences or sum of squares of the differences as disclosed in column 1, lines 66-67 and column 2 lines 1-5 for each search region).**

Minami does not teach associating a respective confidence value with each of the candidate displacement vectors.

Toklu, working in a related problem solving area of motion estimation through image analysis, teaches:

associating a confidence value with a candidate location (**column 10, lines 36-39).**

It would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have associated Toklu's confidence value for a candidate location with Minami's candidate displacement vectors in order to get a more reliable result (**Toklu: column 6, lines 6-8).**

Minami in combination with Toklu discloses providing the estimated displacement of the object based at least in part on an evaluation of the confidence values (**Minami: column 13, lines 7-9).**

**Summary of Applicant's Remarks:** Minami does not disclose "associating a respective confidence value with each of the candidate displacement vectors" or "providing the estimated displacement of the object based at least in part on an evaluation of the confidence values". Minami discloses that for each template a respective displacement vector is determined in each search area, and for each template the reference vector and the respective displacement vector are summed to produce the motion vector for the template. Minami uses the "sum of an absolute value of differences" as a search parameter to identify the location in the search area that best matches the template. The best match location is used to determine the motion vector. Minami does not disclose the search parameter as being used after the motion vector for the template has been determined.

**Examiner's Response:** The lack of limitation introduced by the association of confidence values with displacement vectors has been resolved in the 103(a) rejection presented above. With respect to the displacement vector for each template, Minami's template is merely one of several objects in the image; Minami's teaching with respect to each template, combined with Toklu as disclosed above, meet the claim limitations concerning displacement of an "object".

The original 102(b) rejection is withdrawn and an alternate 103(a) rejection is provided above.

**(New 103(a) rejection)** Regarding **amended Claim 2**, Minami combined with Toklu discloses a method as defined in Claim 1 above, wherein the ascertaining

comprises determining the search regions based on search parameters selected from the group that consists of search region dimensions (**Minami: column 2, lines 5-14**), motion model trajectory (**Minami: column 3, lines 52-63**), search range and step size (**Minami: column 6, lines 18-23**).

**(New 103(a) rejection)** Regarding **amended Claim 3**, Minami combined with Toklu discloses a method as defined in Claim 2 above, wherein determining the search regions comprises: determining a range of displacement of the object between the first image and the second image (**Minami: column 7, lines 32-38, i.e. reference vector**); selecting step size for traversing the range within the second image (**Minami: column 5, lines 32-34 and column 6, lines 21-23**); and determining the plurality of search regions within the second image based upon the selected step size and the selected range of displacement (**Minami: column 3, lines 17-21 and 52-59**).

**(New 103(a) rejection)** Regarding **amended Claim 5**, Minami combined with Toklu discloses a method as defined in claim 1 above, wherein the ascertaining comprises determining the search regions such that adjacent ones of the search regions overlap one another (**Minami: Fig. 9**).

**(New 103(a) rejection)** Regarding **amended Claim 6**, Minami combined with Toklu discloses a method as defined in claim 1 above, wherein the ascertaining comprises determining the search regions such that the search regions lie along a path across the second image (**Minami: column 3, lines 52-63**).

**(New 103(a) rejection)** Regarding **amended Claim 9**, Minami combined with Toklu discloses a method as defined in claim 1 above, wherein the ascertaining comprises performing a multiresolution analysis to determine the respective candidate object locations **(Minami: column 2, lines 42-47)**.

**Summary of Applicant's Remarks:** Each of claims 2, 3, 5, 6, 8 and 9 incorporates elements of independent claim 1 and therefore is patentable over Minami for at least the same reasons explained above.

**Examiner's Response:** The lack of limitation introduced by the incorporated elements of claim 1 has been resolved in the 103(a) rejection presented above.

The respective original 102(b) rejections are withdrawn, with the exception of claim 8, and respective alternate 103(a) rejections are provided above. Claim 8 has been cancelled by applicant.

**(New 103(a) rejection)** Regarding **amended claims 13 and 17**, since method, system and apparatus are analogous, the system of claim 13 and apparatus of claim 17 are anticipated by Minami in combination with Toklu as discussed in the method of claim 1 above.

**(New 103(a) rejection)** Regarding **amended Claim 14**, Minami combined with Toklu discloses a system as defined in claim 13, further comprising a search region generator operable to determine the search regions based on search parameters comprising search range and step size **(Minami: column 6, lines 18-23)**.

**Summary of Applicant's Remarks:** Claims 13 and 17 recite elements that essentially track the pertinent elements of independent claim 1. Claim 14 incorporates elements of independent claim 13.

**Examiner's Response:** The lack of limitation introduced by the incorporated elements of claim 1 and analogous claims 13 and 17 has been resolved in the 103(a) rejection presented above.

The respective original 102(b) rejections are withdrawn and respective alternate 103(a) rejections are provided above.

3. **(New grounds)** Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Minami in view of Toklu as applied to claim 1 above, and further in view of Hanna et al. (Hereinafter "Hanna"; US Patent Application 2001/0019621).

**(New 103(a) rejection)** Regarding **amended Claim 10**, Minami combined with Toklu teaches a method as defined in claim 1.

Minami combined with Toklu does not teach the limitation wherein the ascertaining comprises performing an optical flow analysis to determine the respective locations of the object in the search regions.

However, Hanna teaches an object displacement estimate comprising an optical flow analysis **(page 5, ¶52 lines 10-13)**.

Therefore, it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have modified the Minami-Toklu method of claim 1 with Hanna's teaching above. The motivation to combine being that Hanna's



modification serves as a predictor of depth in the first and second images (**page 5, ¶52 lines 12-15**).

**Summary of Applicant's Remarks:** Claim 10 incorporates elements of independent claim 1 which are not disclosed by Minami or Hanna.

**Examiner's Response:** The lack of limitation introduced by the incorporated elements of claim 1 has been resolved in the 103(a) rejection presented above.

The original 103(a) rejection is withdrawn and an alternate 103(a) rejection is provided above.

4. **(New grounds)** Claims 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Minami in view of Toklu as applied to claim 2 above.

**(New 103(a) rejection)** Regarding **amended Claim 4**, Minami combined with Toklu teaches a method as defined in claim 2 further comprising:

evaluating each of the confidence values with respect to a cutoff condition

**(Minami: column 9, lines 56-62, i.e. utilizing sums of squares of the differences to determine a confidence value as suggested by Toklu in claim 1 above);**

in response to a determination that none of confidence values satisfies the cutoff condition, selecting at least one new search parameter and repeating the ascertaining, the determining of the respective candidate displacement vectors, and the associating based on the selected new search **(Minami: column 19, lines 12-19)**.

5. **(New grounds)** Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Minami in view of Toklu as applied to claim 1 above.

**(New 103(a) rejection)** Regarding **amended Claim 7**, Minami combined with Toklu discloses a method as defined in claim 1 above, wherein the ascertaining comprises determining the search regions based on a selected step size **(Minami: column 6, lines 18-23)**.

**Summary of Applicant's Remarks:** Claims 4 and 7 incorporate elements of independent claim 1 which are not disclosed by Minami or Sim.

**Examiner's Response:** The lack of limitation introduced by the incorporated elements of claim 1 has been resolved in the 103(a) rejection presented above. The limitations of the amended claim 4 are disclosed in the combination of Minami and Toklu without reference to Sim.

The original 103(a) rejections are withdrawn and alternate 103(a) rejections are provided above.

6. **(New grounds)** Claims 15 and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minami in view of Toklu as applied to claim 13 above.

**(New 103(a) rejection)** Regarding **amended Claim 15**, Minami combined with Toklu discloses a system as defined in claim 13 above, wherein the validity comparator is operable to evaluate each of the confidence values with respect to a cutoff condition **(Minami: column 9, lines 56-62, i.e. utilizing sums of squares of**

**the differences to determine a confidence value as suggested by Toklu in claim 1 above).**

**(New 103(a) rejection)** Regarding **amended Claim 16**, Minami combined with Toklu discloses a system as defined in claim 15 above, further comprising a search region generator, wherein in response to a determination that none of the confidence values satisfies the cutoff condition:

The search region generator is operable to select at least one new search parameter and determine new search regions in the second image based on the selected new search parameter **(Minami: Fig.8, S44);**

The object displacement estimator is operable to ascertain a respective new candidate location of the object in each of the new search regions **(Minami: Fig.8, S41)**, and for each of the new search regions, determine a respective new candidate displacement vector relating the respective new candidate location of the object and a location of the object in the first image **(Minami: Fig.8, S42);**

and the validity measurer operable to associate a respective new confidence value with each of the new candidate displacement vectors **(Minami: column 9, lines 56-62, i.e. utilizing sums of squares of the differences to determine a confidence value as suggested by Toklu in claim 1 above).**

**Summary of Applicant's Remarks:** Claims 15 and 16 incorporate elements of independent claim 13 which are not disclosed by Minami or Sim.

**Examiner's Response:** The lack of limitation introduced by the incorporated elements of claim 13 has been resolved in the 103(a) rejection presented above. The limitations of the amended claims 15 and 16 are disclosed in the above combination of Minami and Toklu without reference to Sim.

The original 103(a) rejections are withdrawn and alternate 103(a) rejections are provided above.

7. **(New grounds)** Claims 11 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Minami in view of Toklu as applied to claim 1 above.

**(New 103(a) rejection)** Regarding **amended Claim 11**, Minami combined with Toklu teaches a method as defined in claim 1, wherein the associating comprises for each of the candidate displacement vectors performing an image reconstruction and correlation analysis based on the candidate displacement **(Toklu: column 9 line 35 to column 10 line 9)**.

**(New 103(a) rejection)** Regarding **amended Claim 12**, Minami combined with Toklu teaches a method as defined in claim 1.

Minami combined with Toklu does not disclose the limitation wherein the associating comprises for each of the candidate displacement vectors performing a residual error analysis based on the candidate displacement vector to determine the associated confidence value.

However, performing a residual error analysis was well known in the art at the time of the invention.

Therefore it would have been obvious to one of ordinary skill in the art, at the time the invention was made, to have accomplished the associating by performing a residual error analysis.

**Summary of Applicant's Remarks:** Claims 11 and 12 incorporate elements of independent claim 1 which are not disclosed by Minami.

**Examiner's Response:** The lack of limitation introduced by the incorporated elements of claim 1 has been resolved in the 103(a) rejection presented above.

The original 103(a) rejection is withdrawn and an alternate 103(a) rejection is provided above.

8. **New Claims 18-20** are rejected under 35 U.S.C. 103(a) as being unpatentable over Minami in view of Toklu as applied to claim 1 above.

Minami combined with Toklu discloses a method and analogous system and apparatus as defined in claim 1, wherein the providing comprises selecting the candidate displacement vector associated with a highest one of the confidence values as the estimated displacement of the object (**Toklu: column 10, lines 24-39**).

### ***Conclusion***

9. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Clifton G. Daley whose telephone number is 571-270-3144. The examiner can normally be reached on Monday - Friday 7:30am - 4:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Samir Ahmed can be reached on 571-272-7413. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

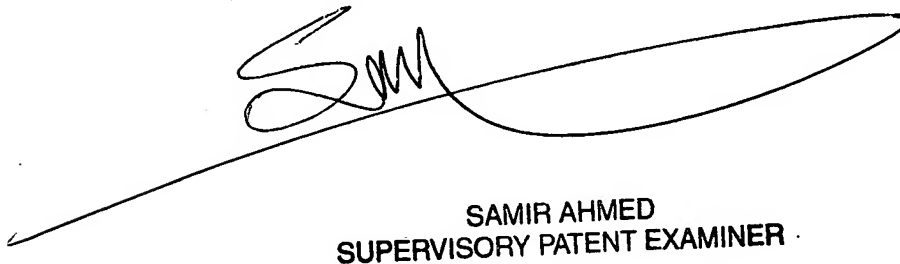
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